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# Challenges while MOOCifying a HE eLearning course on Universal Accessibility

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## ABSTRACT

There are some similarities in developing a traditional Higher Education (HE) eLearning course and MOOCs (Massive Open Online Courses), due to the use of the basis of eLearning instructional design. But in MOOCs, students should be continually influenced by information, social interactions and experiences forcing the faculty to come up with new approaches and ideas to develop a really engaging course. In this paper, the process of MOOCifying an online course on Universal Accessibility is detailed. The needed quality model is based upon the one used for all online degree programs at our university and on a variable metric specially designed for UNED MOOC courses making possible to control how each course was structured, what kind of resources were used and how activities, interaction and assessment were included. The learning activities were completely adapted, along with the content itself and the on-line assessment. For this purpose, the Gardner's Multiple Intelligences Product Grid has been selected.

## CCS Concepts

H.1.2 [Information systems]: User/Machine Systems – human factors, human information processing. H.5.2 [Information Interfaces and Presentation]: User Interfaces – standardization, prototyping, user-centered design. K.3.1 [Computers and Education]: Computer Uses in Education – Collaborative learning, Distance learning. K.4.2 [Computers and Society Issues]: Social Uses – assistive technologies for persons with disabilities, handicapped persons/special needs.

## Keywords

MOOC; instructional design; eLearning; universal accessibility; quality model; multiple intelligences.

## 1. INTRODUCTION

MOOCs are a recent hit in online learning and in some cases are positioned as an alternative to traditional HE courses [1]. It offer teachers, researchers and practitioners with the opportunity to experiment in the pedagogical field, to study different possibilities for using their elements in on-line campus settings as a form of flipped classroom or blended learning approach [2].

The pedagogical and visual design of MOOCs, their information architecture, usability and interaction design has been analyzed previously in adult learning [3, 4, 5]. MOOCs are usually developed and delivered as independent online courses, but some experiments have been reported by teachers and researchers in different articles to wrap formal university courses around existing MOOCs [6, 7, 8, 9], and also other with a different approach where the participation of students in different MOOCs was integrated in a blended course run on a social mobile Learning Management system [10].

The design of a MOOC can be addressed from the perspective of learning design [11], a research field that provides tools and methods for both articulate and represent the design process of learning experiences, while assisting educators in planning and organizing pedagogically educational actions [12]. Learning design methods and tools have been shown especially beneficial when employed to design MOOCs, in which a significant number of resources and stakeholders are involved [13]. In this context, authors have followed the conceptual framework for supporting educators in the description and design of MOOCs called the MOOC Canvas [14]. The MOOC Canvas defines eleven interrelated issues that are addressed through a set of questions, offering a visual and understandable guidance for educators during the MOOC design process.

The paper is structured as follows. First, quality issues regarding MOOC's design and production are analyzed, followed by the presentation of the hybrid approach to MOOC quality established at UNED. Then the MOOC design process on Universal Accessibility is presented, along with the mapping of new re-factored learning activities with Gardner's Multiple Intelligences Product Grid. Finally, main conclusions of the work are outlined.

## 2. MOOCs AND QUALITY ISSUES

When our university took the decision in 2011 to start the MOOC initiative it was a number of UNED courses that could be prepared and started as a MOOC but, given the heterogeneous nature of the subjects covered and the way in which each teaching team wanted to undertake a course, a first simple systematic quality control had to be undertaken [15], based upon previous UNED experience in online-learning.

Is in this context and when research on the issue of MOOC quality is appearing in the literature, there were no consensus on how quality assessment should be undertaken [16] or even if it makes any sense to try to measure it [17]. The MOOC Quality Project [18], undertaken by the European Foundation for Quality, concluded that it was difficult to define what quality means for MOOC courses since their nature is constantly changing. They highlight some factors that are related to the perception of MOOC quality, such as: the notion of choice, what pre-course information is provided, the

pedagogical approaches supported, the level of student commitment required, whether a course is scheduled or not, its technical requirements, the role of the teaching team, its availability and level of interaction, whether certification is available or not, and others.

Downes [19], as part of his contribution to The MOOC Quality Project, differentiates between the quality of a MOOC in terms of its platform and the related tools (functionality, stability, etc.). He also pointed out whether the outcome of a given instance of a MOOC is successful or not, in a given context with a given student body, noting that “measuring drop-out rates, counting test scores, and adding up student satisfaction scores will not tell us whether a MOOC was successful, only whether this particular application of this particular MOOC was successful in this particular instance”. Daniel [20] even suggested that one approach could be for the courses to be evaluated by learners and educators, leading to league tables that rank the courses by the quality of the offering. In this case, the most significant form of quality assurance and enhancement comes from the reflections and informal evaluations and comments from participants using social media. Mudler [21] proposed a quality model focused on the application of Open Education components at MOOCs. It establishes that the use of Open Educational Resources (OER) is not Open Education by itself, it needs three supply side components: OERs, Open Learning Services (OLS) and Open Teaching Efforts (OTE), and two demand side components: Open to Learner’s Needs (OLN) and Open to Employability & Capabilities development (OEC). The measurements of these five items reflect into a course quality “fingerprint” of the model.

Another quality initiatives that have appeared in 2013 are that of considering MOOCs through the lens of the Quality Code at the QAA (Quality Assurance Agency for Higher Education at the UK) [22], which has influenced the recent OpenupEd label [23], based around the E-xcellence approach of using benchmarks for quality assessment that has been already tested at UNED MOOCs [24]. OpenupEd is the first MOOCs initiative which goes Europe-wide, with the support of the European Commission and refers by its name indirectly to the European program Opening up Education, launched in September 2013. OpenupEd has been initiated and is coordinated by the European Association of Distance Teaching Universities (EADTU), mostly involving open universities, but focused on reaching new partners that perform MOOCs and are keen on opening up education for all. It aims to be a quality brand embracing the diversity in (institutional) approaches to open up education by the use of MOOCs. Although there's a clear diversity of institutional approaches, the partnership has agreed on a framework of eight common features in order to open up education to a maximum level, the 32 benchmarks represent a good first step toward MOOC quality control.

### **3. A HYBRID APPROACH TO MOOC QUALITY AT UNED**

At UNED decisions were taken about how control the courses quality, thereby protecting the university’s brand, and ensuring that the first edition of these courses was successful. The initial quality model was firstly based upon the one used for the online degree programs, which had been developed and refined over more than 15 years and secondly, on the above mentioned OpenupEd label based on the E-xcellence approach, in which some teachers from UNED have been involved [25].

It should be noted that in principle, preparing a MOOC represents much less of a problem for a distance university lecturing staff than

for their face-to-face equivalents, since typically the former have been using several specific guidelines that have been established to course creation. One example are the guidelines related to the syllabus creation that have to be divided into  $n$  modules (overall student workload of 1-5 ECTS) with a short introductory video per module, a self –placed methodology, an interactive user forum to help building a community for the students and teachers, a peer-review and group collaboration, a finally an automated feedback procedures through objective, online assessments, e.g. quizzes and exams. Hence, based upon the complete quality process used in UNED for the blended learning and eLearning courses, a model was defined in terms of two types of control:

1. The structural and functional coherence of a given course, based upon the objectives defined by the teaching team which would be matched to a set of characteristics that could be used to evaluate the initial design of the course [26, 27, 28].
2. The establishment of a flexible certification model (freemium model), that would demonstrate through a standard test-like evaluation, that the course had achieved its objectives and the students had achieved the intended learning goals.

Regarding the former, the establishment of a variable metric for each MOOC made it possible to control how each course was structured, what kind of resources were included and how activities, interaction and assessment was integrated. Specifically, the metric contemplates next aspects [29]:

1. Topic: Each course should be as specific as possible.
2. Contents: materials could be reused from HE courses, although they had to be adapted to the MOOC format (i.e., videos with an approximate duration of 5 minutes, guidelines that would be understandable without the support of teaching staff, activities that either finished with self-evaluation or involved some kind of forum-based collaboration or interaction, etc.).
3. Duration: between 25 and 125 hours of student workload.
4. Structure: UNED MOOCs uses to be divided into  $n$  (4 to 8) modules, depending upon duration and objectives, with  $n$  videos and associated activities and evaluations. The latter is used to consolidate acquired knowledge and foster interaction.
5. Specific instructional design guidelines: courses are designed to be challenges, not lectures, and the amount of data generated from the assessments could be evaluated ‘massively’ using automated systems. Also self-assessment methodology requires students to reflect on their own work and judge how well they have performed.
6. Social channels: Forums are the main interaction tool provided, although other associated Web 2.0 tools could also be included. The forum tool present in the OpenMOOC platform enables stakeholders to vote on any post.
7. In UNED MOOCs, teaching roles are restricted to digital facilitators and content curators. These last being as “critical knowledge broker”, seeks the forums continuously trying to maintain the relevance of the information that flows freely by students for creating information environments.

### **4. A MOOC ON UNIVERSAL ACCESSIBILITY**

The selection of the MOOC follows the objectives of the Spanish Legislative Decree 1/2013 that establishes in its final provision two, that the Government will encourage universities to include new curricula regarding “Universal Design” or “Access for All” matters. The content of the proposed MOOC is based on awareness of the barriers that people with disabilities must face daily while navigating through the Internet, the importance of usability and

accessibility principles and the different approaches that exist to develop the better inclusive design for web pages and portals.

#### 4.1 Universal Accessibility learning objectives

Universal Design provides a new and better approach for development of products and services, therefore, the course will familiarize the student with the accessible use of the Internet and the learning will provide the student with an introduction to:

- The barriers some users with disabilities may face in accessing Internet services.
- Sample strategies for improving accessibility.
- The principles of Universal Design, Access For All and User-Centered Design.
- One framework for web accessibility that removes barriers.
- Assistive technology used for accessing Internet services.

#### 4.2 MOOC design

The MOOC has been designed as a stand-alone course that explores what accessibility and universal design mean and how they can be applied to online environments. As the course was already on third degree of Grade, the teaching staff started by selecting the content that was going to be moocified. The content structure is as follows:

##### MODULE 1. BASIC CONCEPTS ON USABILITY AND WEB ACCESSIBILITY

- 1.1. Understanding Universal Accessibility, facing barriers and challenges ahead
- 1.2. Usability and accessibility: somewhat distinct design concepts
- 1.3. Types of disabilities

##### MODULE 2. WORKING ALONG WITH UNIVERSAL DESIGN, DESIGN FOR ALL AND USER-CENTERED DESIGN

- 2.1. Universal Design and Access For All
- 2.2. User-Centered Design
- 2.3. Assistive technologies and reasonable accommodations

##### MODULE 3. INTERFACE AND CONTENT ACCESSIBLE DESIGN

- 3.1 Web access for people with functional diversity
- 3.2 Adapted and personalized design

After, the available on-line pedagogical resources were collected (video-presentations, pdf documents, conceptual maps, etc.). At this stage some issues were included following the MOOC quality approach defined at UNED:

- A general description (name, duration and field/area).
- The target learners of the course.
- The pedagogical approaches that will be followed.
- The particular objectives and competencies pursued.
- The learning contents that will be delivered.
- The assessment activities employed.
- The complementary technologies to support the MOOC.

As for the content, most of the learning activities were actualized and adapted to the new environment. Students at Grade programs are different in nature from those who attend MOOC courses. For this adaptation the Gardner's Multiple Intelligences Product Grid was selected. Gardner asserted that people possess multiple types of intelligence, and can learn through these various modalities. From the nine intelligences that are the most commonly accepted, the following four have been selected for Universal Accessibility MOOC course taking into account the variety of potential students: Linguistic, Spatial, Intrapersonal and Interpersonal Intelligence.



Figure 1: Modular mini-video with interaction

Table 1 shows the correlation between the 12 re-adapted learning activities (A.1, ... , A.12) specifically designed for the MOOC and re-factored following the Gardner's Multiple Intelligences Product Grid. One example is the modular mini-video [30] specifically designed for spatial learning style in activity A.5 (see fig.1).

Table1: Re-factored learning activities for MOOC

	LEARNING STYLE	TEACHING ACTIVITIES	TEACHING MATERIALS	INSTRUCTIONAL STRATEGIES
<b>MODULE 1.</b>				
1.1	Linguistic	Read about it, write about it	Source documents on the web	<b>A.1</b> Debate, forum participation
1.2	Intra-personal	Independent study	Self-check. material	<b>A.2</b> Personal activities
	Intra-personal	Independent study	Self-check. material	<b>Test 1</b> self-assessment
1.3	Inter-personal	Role play, social gatherings	Accessibility software	<b>A.3</b> Social empathy, case studies
<b>MODULE 2.</b>				
2.1	Spatial	Visual presentations	Graphs, maps, slides	<b>A.4</b> Conceptual maps, charts
	Spatial	Visual presentations	Modular Mini-video	<b>A.5</b> Video
2.2.	Linguistic	Lectures, discussions, read about it, write about it	Source documents on the web	<b>A.6</b> Debate, forum participation
	Intra-personal	Individualized instruction	web accessibility checker	<b>A.7</b> Practice
	Intra-personal	Independent study	Self-check. material	<b>Test 2</b> self-assessment
2.3	Inter-personal	Cooperative Learning, feedback technique	Fill-in tables	<b>A.8</b> Brainstorming team learning
	Intra-personal	Independent study	Web navigation	<b>A.9</b> Object searching
	Intra-personal	Independent study	Audio-description develop.	<b>A.10</b> Self-designed project
	Intra-personal	Independent study	Self-check. material	<b>Test 3</b> self-assessment
<b>MODULE 3.</b>				
3.1	Linguistic	Read about it, write about it	Source documents on the web	<b>A.11</b> Debate, forum participation
	Intra-personal	Independent study	Self-check. material	<b>Test 4</b> self-assessment
3.2	Intra-personal	Independent study	Self-check. material	<b>A.12</b> Personal activities

## 5. CONCLUSIONS

In this paper, it was presented a quality model based upon the one used for all online degree programs at UNED university, complemented with the OpenUpEd label features, and the instructional design based on a variable metric specially designed for UNED MOOC courses that makes it possible to control how each course is structured, what kind of resources are included and how activities, interaction and assessment are integrated. Specifically, the metric contemplates seven aspects that are: topic, contents, duration, structure, specific instructional design guidelines, social channels and teaching roles. The process of MOOCifying a regular course on Universal Accessibility has been outlined. The learning activities were re-factored, in order to be adapted to the expected students, along with the content itself and the on-line assessments. For this purpose, the Gardner's Multiple Intelligences Product Grid has been selected and applied.

## 6. ACKNOWLEDGMENTS

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